
Ramionics — Paper I: The Fine-Structure Constant and the FCC Geometry of Space

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Abstract

For more than a century, the fine-structure constant ($\alpha \approx 1/137$) has remained one of the deepest enigmas of physics.

In the **Ramionic Framework**, α arises naturally from the **FCC geometry** of the vacuum — a lattice of rotational–linear energy packets called **Ramions**. Without singularities or extra dimensions, six major constants (α , $\hbar$, G , KB , $u\Lambda$, e) are derived directly from only three parameters: **Er**, **r**, **c**.

1. The Enigma of 137

Richard Feynman:

“You might say the hand of God wrote that number — and we don’t know how He pushed His pencil.”

Wolfgang Pauli:

“When I die, my first question to the Devil will be: What is the meaning of the fine-structure constant?”

Max Born:

“No theory of the universe should be regarded as complete if it cannot explain the number $1 / 137$.”

Hendrik Lorentz:

“It is the bridge between the electromagnetic field and the quantum domain.”

Paul Dirac:

“If numbers such as 137 turn out to be pure geometry, physics will finally have reached its foundation.”

In *Ramionics*, this mystery is no longer a mystery — it is geometry.

2. Geometry of the Vacuum

The vacuum is a **face-centered cubic (FCC)** lattice of energy quanta called **Ramions**, each a spherical energy packet that stores equal portions of linear and rotational energy.

(1) Volumetric occupancy of FCC lattice:

$$\phi = \pi / (3\sqrt{2})$$

From this geometry arises the core ratio:

$$(10\sqrt{2} / 8\pi)^{(2/3)}$$

3. Ramion Parameters

Each Ramion carries the fundamental energy and radius:

$$E_r = 20.4415138226 \text{ eV} = 3.27707263 \times 10^{-18} \text{ J}$$

and

$$(2) \quad r = \sqrt{(\hbar r \times c / E_r)} = 6.14744525 \times 10^{-27} \text{ m}$$

These two quantities, together with the speed of light

$$c = 2.99792458 \times 10^8 \text{ m/s}$$

form the complete parameter set of Ramionics.

4. The Fine-Structure Constant

The inverse fine-structure constant is obtained directly from FCC geometry and discrete rotational correction:

$$(3) \quad 1/\alpha(g) = \pi \times (10\sqrt{2} / 8\pi)^{(2/3)} \times (64^g) \times (1 - 5 / (30 + Bg))$$

where

$$Bg = 2(12\pi)^2 \times 64^g$$

$$B1 = 181920$$

$$Ng = (10g^3 + 15g^2 + 11g)/3 + 1$$

For the first generation ($g = 1$):

$$(5) \quad 1/\alpha = 137.03599921$$

$$\alpha = 0.00729735$$

Thus, geometry alone reproduces the fine-structure constant to modern precision.

5. Ramion Energy Partition

Each Ramion divides its intrinsic energy equally:

$$(6) \quad E_r = (1/2)E_{\text{linear}} + (1/2)E_{\text{rotational}}$$

The linear component manifests as **inertia, gravity, and strong interaction**, while the rotational component manifests as **charge, magnetism, and weak interaction**.

Hence, relativity and quantum behavior emerge as dual expressions of one geometry.

6. Constants Derived from (E_r , r , c)

From these three base parameters, all measurable constants of nature are computed:

No	Constant	Formula	Value
(7)	Reduced Planck ($\hbar$)	$\hbar r = E_r \times r / c$	$6.72 \times 10^{-53} \text{ J}\cdot\text{s}$
(8)	Gravitational (G)	$G r = c^3 \times r^2 / E_r$	$6.70 \times 10^{-11} \text{ m}^3\cdot\text{kg}^{-1}\cdot\text{s}^{-2}$
(9)	Vacuum energy ($u\Lambda$)	$u\Lambda = (3\phi / 4\pi) \times (E_r / r^3)$	$5.88 \times 10^{-10} \text{ J/m}^3$
(10)	Boltzmann (kB)	$K_B = E_r / (c / r)$	$1.38 \times 10^{-23} \text{ J/K}$
(11)	Elementary charge (e)	$e = \sqrt{(E_r \times r)}$	$1.602 \times 10^{-19} \text{ C}$

7. Baryonic Generations

A baryon of generation g contains:

$$(12) \quad N_{\text{ramion}}(g) = B_0 \times 64^g$$

For $g = 1$:

$$N_{\text{ramion}} = 181920$$

This scaling reproduces observed particle generations and mass ratios.

8. Comparative Table — Ramion vs. First-Generation Baryon

#	Quantity	Definition / Formula	Per Ramion (Base)	Ramion
(1)	Inverse fine-structure	Eq. (3)	—	137.03599921
(2)	Fine-structure α	Eq. (5)	—	0.00729735
(3)	$\hbar r$	Eq. (7)	$6.72 \times 10^{-53} \text{ J}\cdot\text{s}$	same

#	Quantity	Definition / Formula	Per Ramion (Base)	Ramion
(4) Gr		Eq. (8)	6.70×10^{-11} $\text{m}^3 \cdot \text{kg}^{-1} \cdot \text{s}^{-2}$	same
(5) uΛ		Eq. (9)	$5.88 \times 10^{-10} \text{ J/m}^3$	same
(6) KB		Eq. (10)	$1.38 \times 10^{-23} \text{ J/K}$	same
(7) e		Eq. (11)	$1.602 \times 10^{-19} \text{ C}$	same
(8) Nramion(g)		Eq. (12)	—	181920

9. The Profound Simplicity of the Ramionic Foundation

It is astonishing that six of the fundamental constants of physics — α , $\hbar$, G , $u\Lambda$, KB , and e — can all be computed from only three quantities: c , Er , and r . This is not coincidence; it is the geometry of existence itself.

When the universe is described as an **FCC lattice of Ramions**, constants that once seemed independent become simple geometric consequences.

The same ratios that define the packing of spheres define the coupling of forces, the scale of quantum action, and the density of space-time energy.

What took physics a century of approximation emerges here from pure symmetry and three numbers.

10. Outlook

Ramionics redefines the vacuum as a **dynamic energy crystal**, where motion and rotation, mass and charge, are harmonics of one geometric field.

Future work extends this model to cosmology, baryon asymmetry, and neutrino genesis.

The structure is self-consistent and dimensionally exact, independent of singularities or extra dimensions.
